CAMBRIA IRON COMPANY,
BLAST FURNACES NO. 5 & 6
(Bethlehem Steel Company, Blast Furnaces E & F)
Cambria Iron Works
Lower Works
Johnstown
Cambria County
Pennsylvania

HAER No. PA-109-F

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
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HISTORIC AMERICAN ENGINEERING RECORD

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(Bethlehem Steel Company, Blast Furnaces E and F)
Cambria Iron Works

HAER No. PA-109-F

Location:	Lower Works, Johnstown, Cambria County, Pennsylvania Quad: Johnstown, Pennsylvania UTM: 17 E.676550 N.4466660
Date of Construction:	ca. 1873-8
Fabricator:	unknown
Present Owner:	Bethlehem Steel Corporation
Present Use:	Demolished
Significance:	The two furnaces were the largest in the area and nearly identical in size to the impressive Lucy No. 2 (1878) and Edgar Thomson "A" (1880), two of Andrew Carnegie's blast furnaces in Pittsburgh. Each furnace measured 75' in height and contained a bosh 20' in diameter, with a hearth 8' in diameter. Capped with a single bell, both furnaces were manually charged. Each produced 600 tons of Bessemer iron per week.
Historian:	Gray Fitzsimons

Project Information:

The results of the study of Cambria County were published in 1990: Fitzsimons, Gray, editor, Blair County and Cambria County, Pennsylvania: An Inventory of Historic Engineering and Industrial Sites (Washington, D.C.: America's Industrial Heritage Project (AIHP) and HABS/HAER, National Park Service). The contents of the publication were transmitted to the Library of Congress as individual reports. Research notes, field photos and copies of historic photos collected during the project were transmitted to the AIHP Collection, Special Collections, Stapleton Library, Indiana University of Pennsylvania, Indiana, PA 15705.

HISTORY

Soon after the Cambria Iron Company established its first Bessemer plant in 1869, Johnstown became one of the nation's leading iron and steel producers, and, by the mid-1870s, was the leading producer of iron and steel rail in the United States. Led by Daniel J. Morrell, the president of Cambria Iron, and Daniel N. Jones, the chief engineer, the company expanded its iron production with the introduction of two additional blast furnaces. Both were located south of the original four blast furnaces and adjacent to the rolling mill. In 1873, Cambria Iron began the construction of Blast Furnace No. 5 , however it was not put into blast until 1876. Two years later Cambria Iron completed Blast Furnace No. 6. The two furnaces were the largest in the area and nearly identical in size to the impressive Lucy No. 2 (1878) and Edgar Thomson "A" (1880), two of Andrew Carnegie's blast furnaces in Pittsburgh. Each furnace measured 75' in height and contained a bosh 20' in diameter, with a hearth 8' in diameter. Capped with a single bell, both furnaces were manually charged. Each produced 600 tons of Bessemer iron per week.

By the time Blast Furnaces No. 5 and No. 6 were completed the understanding of the chemistry of iron and steel making had advanced considerably from that of even a decade earlier. Under the direction of Daniel Jones, who had succeeded his brother, Captain William P. Jones, as chief engineer, Cambria Iron's new blast furnaces received carefully controlled amounts of ore, limestone, and coke. The composition of ore used in the furnaces in which Bessemer metal was produced consisted of one-half Springfield limonite ore (averaging 50 percent iron), and one-half Lake Superior specular ore (containing 60 to 66 percent iron). Interestingly, the native spathic ore, which was self-fluxing, was not used in the production of Bessemer metal, but it appears to have been used for other grades of metal, such as wrought iron. Two years after Cambria Iron put it into blast, engineer Alexander Holley declared that the Furnace No. 5 was "uniformly successful in its performance, which is largely due to its excellent management on chemical principles, and partly, of course, due to its construction."

From the 1870s through about 1900, Blast Furnace No. 5 and No. 6 were run with few changes to their operation. Both furnaces were provided with steam by cylinder boilers housed in adjacent boiler houses. However, in 1901-03 the recently reorganized Cambria Steel Company, installed steam driven skip hoists, superseding the original manually charged operation. In the 1920s after the Bethlehem Steel Company acquired Cambria Steel, the four original

blast furnaces were torn down leaving only No. 5 and No. 6 in the Lower Works, as well as the five blast furnaces at Franklin.

Shortly after Bethlehem Steel acquired Cambria, it renamed all of the blast furnaces: No. 5 became "E" Furnace and No. 6 became "F" Furnace. In 1924 and 1925, Bethlehem Steel replaced Blast Furnace E, erecting a new furnace, cast house, and electric skip hoist. Further improvements occurred between 1930 and 1931 with the installation of new stock bins and a gas cleaning plant. Additionally, high efficiency hot blast stoves were built at E Furnace in 1930, and at F Furnace in 1934.

By the 1950s, Bethlehem Steel used E and F Furnaces almost exclusively for smelting manganese. In fact, in 1957 Bethlehem's manganese production in Johnstown amounted to 180,000 tons, the largest of any plant in the nation. The manganese ore was imported from Bethlehem mines in South America. Blast Furnaces E and F increasingly deteriorated over the next decade as Bethlehem did little to improve blast furnace plants in Johnstown. Blast Furnace F was torn down in the 1960s, followed by the abandonment of E in 1977. Unfortunately, Blast Furnace E, Johnstown's last extant blast furnace, was torn down in November of 1986.

SOURCES:

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Holley, A.L. and Smith, Lenox. "American Iron and Steel Works: Works of the Cambria Iron Company," Engineering: An Illustrated Weekly Journal, Vol. 26, (12 July 1878): 21-24.

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